हर कदम, हर डगर
किसानों का हमसफर
भारतीय कृषि अनुसंधान परिषद
Agri search with a human touch

भाकृअनुप
ICAR

PULSES Newsletter

ICAR-Indian Institute of Pulses Research, Kanpur

VOLUME 28, No. 4 OCTOBER-DECEMBER, 2017

National Symposium on "Pulses for Nutritional Security and Agricultural Sustainability" held at IIPR

Indian Society of Pulses Research and Development in collaboration with ICAR-Indian Institute of Pulses Research, Kanpur organized a National Symposium on **"Pulses for nutritional security and agricultural sustainability"** to commemorate the Golden Jubilee Year of Pulses Research in India at IIPR, Kanpur during December 2-4, 2017. The Symposium was inaugurated by Padma Bhushan Prof. R.B. Singh, the Chief Guest, while Dr. M.C. Saxena, Ex. ADG, ICARDA and Dr. S. Solomon, VC, CSAUA&T, Kanpur were the guests of honour. Dr. N.P. Singh, President, ISPRD was present on the occasion.

Speaking on this occasion, Prof. R.B. Singh congratulated pulse scientists for all time high 22.95 million tonnes of pulses. He expressed concern over the fluctuating production of pulses in the country and exhorted to address the reasons for this. He urged the scientists to work for the benefit of farmers. He emphasized that farmers ought to be partner in various research based programmes and these research activities, if applied on their fields, will surely deliver yield better results. Dr. S. Solomon, Vice-Chancellor, CSAUA&T, Kanpur and Dr. M.C. Saxena, Ex. ADG, ICARDA also expressed their views on research advancements in achieving self sufficiency and nutritional security in pulses in the nation.

Dr. N.P. Singh, Director, IIPR, briefed about the distinctive activities going-on in the Institute. He informed that the various projects under national programmes have been widely successful. In the ***'International Year of Pulses'***, research and development activities of the Institute were further strengthened towards increasing productivity which resulted in an all time high production of pulses *viz* 22.95 million tonnes.

Around three hundred delegates (including foreign delegates, scientists, educationists, students, industrialists and farmers from different parts of the country) participated in the Symposium and discussed the research advancements in pulses in the country. On the second day, Dr. H.D. Updhyaya from ICRISAT and Dr. P.K. Chakrabarty, ADG, ICAR, New Delhi presided over the scientific sessions during which important strategies were prepared. To save pulse crops from different diseases/insects, permission to use suitable insecticides is awaited from the Central Insecticide Board. Moreover, topics like value addition in pulses, doubling farmers' income, various usage of mini *Daal Mill*, role of private sector in enhancing pulse production of the country were the centre of scientific interactions.

Closing ceremony of the Symposium was presided over by Dr. G.B. Singh, former VC & Director General, UPCAR during which Dr. H.C. Sharma, Vice-Chancellor was given Excellence Award and eighteen scientists/researchers were offered ISPRD Fellowship. Dr P.K. Katiyar, Secretary, ISPRD offered vote of thanks to all the guests and participants.

CONTENTS

IMC Meeting held at the Institute

The 39th Institute Management Committee meeting was held on 29th December, 2017 under the chairmanship of Dr. N.P. Singh, Director. The meeting was attended by Dr. Ram Awatar Sharma, Pr. Scientist, CAZRI, Jodhpur; Dr. C. Bhardwaj, Pr. Scientist, IARI, New Delhi; Dr. S. Natarajan, Pr. Scientist, IARI-RBGRC (TN); Dr. A.N. Sharma, Pr. Scientist, DSR, Indore; Dr. Ram Sharan Katiyar and Sh. Shiv Poojan Singh Chandel, farmer representations along with all Heads of Divisions and Project Coordinators. Besides deliberations on various agenda items, the members appreciated the progress made by the institute.

Chairman and Member Secretary of IMC

Celebration of World Soil Day

To commemorate the importance of soil as a critical component of the natural system and nurture of human well being, World Soil Day was organized at the Institute on December 5, 2017. On this occasion, Dr. I.P. Singh, Officiating Director was the Chief Guest while Dr. C.S. Praharaj, Head (Acting), Division of Crop Production, was the Chairman. Dr. Ummed Singh, Senior Scientist coordinated the programme.

While welcoming the participants, Dr. I.P. Singh stressed upon the importance of soil health, natural resources and soil *rhizosphere* which are the pillars of soil sustainability. He emphalized the importance of pulse-soil symbiosis as a building block for sustaining both crop and human/animal life on a long-term basis and also emphasized the need to protect our soil.

Short Course on Next Generation Fertilizers

An ICAR sponsored short course on **'Enhancing Nutrient Use Efficiency through Next Generation Fertilizers in Field Crops'** was organised at IIPR, Kanpur during November 21-30, 2017. The objectives of the short course was to sensitize the participants about the present status and future perspectives of next generation fertilizers and to enable them to acquire the knowledge on the latest techniques/strategies for enriching nutrient use efficiency in field crops through efficient fertilizer use. Prof. Mohan stressed that working on nutrient symbiotic relationship between sugarcane and pulses intercropping needs to be explored extensively.

Dr. N.P. Singh, Director, ICAR-IIPR, Kanpur expressed his satisfaction over the fact that the country has achieved self-sufficiency in food crops and highlighted the contribution of ICAR-IIPR towards increasing pulses production in the country. Dr. Singh reiterated on the role of developing nutrient use efficient genotypes of filed crops. Dr. C.S. Praharaj highlighted the futuristic scope of speciality fertilizers. Twenty three participants belonging to ICAR Institutes/SAUs located in more than 7 states attended the short course at ICAR-IIPR, Kanpur.

IIPR organized Summer School

An ICAR sponsored Summer School entitled "**Scaling Water Productivity and Resource Conservation in Upland Field Crops ensuring More Crop Per Drop**" was organized during Sept. 6-26, 2017 at ICAR-IIPR, Kanpur. Twenty five participants belonging to ICAR Institutes/Universities of 9 states participated in this training programme.

In his Inaugural address, Dr. S.S. Singh, Director, ATARI Zone V, Kolkata emphasized on the role of water in food production besides the role of water management, market and input management for crop production. Dr. Masood Ali, former Director, IIPR revealed that freshwater availability is only 2.8% of which 30% is available to human use only.

Dr. N.P. Singh, Director, IIPR expressed his satisfaction and happiness with the positive feedback from the participants for the organization of the Summer School. He emphasized that **More Crop Per Drop** is the need of the hour to deal with challenges like climate change. Prosperity and happiness can be positively correlated with availability of water as existence of our very civilization started on the bank of rivers. Dr. S.K. Singh, Chief Guest of the function emphasised that there is no other short-cut way but to save water as it cannot be produced in the labs.

AICRP Group Meet held at Gwalior

The Annual Group Meet of AICRP on MULLaRP was held at Gwalior on November 10-11, 2017. About 80 delegates from SAU's and cooperating centres participated in the Group Meet. Dr. S.K. Rao, Vice-Chancellor, RVSKVV, Gwalior, in his chairman remarks, expressed happiness over the research and development efforts for promotion of pulses in new niches specially in spring, summer and rice-fallow conditions and specifically mentioned the success of short duration varieties of mungbean occupying large niches in the country and in many states, urdbean is becoming alternatives to soybean in

kharif season. Dr. A.K. Singh, Chief Guest applauded the role of pulses in food security, sustainability and nutritional security.

Dr. Sanjeev Gupta, Project Coordinator, MULLaRP crops expressed that there is tremendous scope of horizontal and vertical increase in production of mungbean and urdbean and specifically discussed on the grey areas in increasing production and productivity of rice fallow pulses. Dr. Shiv Sewak, Nodal Officer, Network Research Project on Arid Legumes, presented the summary of progress in arid legumes during the last spring/summer seasons. Dr. N.P. Singh, Director, IIPR desired that early duration varieties are the need of the hour and the special trials should be conducted for conducting extra early trials across a large number of locations. One variety of cowpea TC 901 was identified for release in the northern parts of the country for summer cultivation.

Research Highlights

Agronomic Evaluation of Transgenic Pigeonpea Lines

Agronomic evaluation of transgenic plants is an important endeavour for their characterization. Guidelines for conduct of test for Distinctness, Uniformity and Stability (DUS) as prescribed by PPV & FRA, Government of India serves as standard document to establish identity of a genotype. Transgenic pigeonpea lines harboring synthetic *Bt* gene in the background genotype of popular pigeonpea cultivar, Asha (ICPL 87119) are available at IIPR. Event selection trial of 5 transgenic pigeonpea events (traits insect resistance) is being carried out to select an event that can be taken forward for Biosafety Research Level Trials. Twenty one characters specific to pigeonpea genotype articulated in the Table of Characteristics (Section VII) of the guidelines are being evaluated and recorded in all the transgenic lines *vis-a-vis* parental genotype, Asha, at different stages *viz*., seedling, pre-flowering, post-flowering and maturity.

Alok Das, Alok Shukla, Ravi Ranjan Singh, Malkhan Singh and N P Singh

Management of *Heterodera cajani* with Suitable Cropping Sequences

Pigeonpea cyst nematode, *Heterodera cajani* is an economically important nematode-pest of pigeonpea, mungbean, urdbean and cowpea. To find out suitable cropping sequences, experiment was laid out in pot cultivars with four different cropping sequences. It was observed that in cropping sequence 1, when long duration pigeonpea was grown in continuation, the cyst population increased and stabilised at a high level. In cropping sequence 2, growing of two non-host crops reduced the cyst population but growing of host crop, urdbean, increased the population. In cropping sequence 3, non-host wheat crop did not affect the cyst population but growing of two susceptible crops, mungbean and urdbean increased the cyst population to the maximum level of 96 cysts/100 cc soil. Growing of all non host crops reduced the cyst population the minimum level of 8 cysts/100 cc soil which was observed in cropping sequence 4. Hence, it is inferred that for at least two years non-host crops should be grown to suppress the cyst population in the field.

Bansa Singh and Devindrappa, M.

Zinc Coating for a Healthier Start

To ascertain the benefits of seed coating, a field experiment on chickpea genotypes 'HC 5' and 'JG 16' under varying seed coatings (no coating, 2.5, 5.0 and 7.5%) was carried out at ICAR-IIPR, Kanpur which showed enhanced plant growth attributes following Zn seed coating upto 7.5% by seed weight. Seed coating of both chickpea genotypes 'HC 5' and 'JG 16' had significant improvement in plant height (17.3 and 14.7cm), dry matter accumulation (0.247 and 0.233 g/plant) and nodulation (14.6 and 13.4/plant) over without seed coating. Attaining markedly higher growth attributes (plant height, dry matter and nodulation) at early growth stages (30 days after sowing of chickpea) might give healthier start to the plant for early seedlings vigour and better establishment. Therefore, seed coating could be an effective ferti-fortification approach for healthier start of plant in addition to mitigate deficiency of zinc in soil partially.

Ummed Singh, C S Praharaj and Lalit Kumar

Event Selection Trial Conducted

Gram pod borer (*Helicoverpa armigera* H.) is an devastating insect-pest of chickpea accounting to 10-40% average annual loss. Resistance source against this insect has not been identified in chickpea gene pool. Genetic engineering of chickpea (*Cv.* DCP 92-3) with *Bt* gene from *Bacillus thuringiensis*, offers promise of insect resistance/tolerance, as demonstrated in crops like cotton and brinjal.

Transgenic chickpea lines harbouring synthetic *Bt* gene (*cry1Ac*/*cry1Aabc*) have been developed by IIPR

An aerial view of Event Selection Trial

and five promising lines exhibiting high insect mortality (75-100%) were identified. Permission to conduct Event Selection Trial was obtained from regulatory bodies *viz*. Review Committee on Genetic Manipulation, Department of Biotechnology, Ministry of Science and Technology and Genetic Engineering Appraisal Committee, Ministry of Environment, Forest & Climate Change, GoI to identify the best event that can be advanced to Biosafety Research Level (BRL) trials. The selection trial was laid at IIPR Main Research Farm during *rabi* 2017.

Alok Das, Meenal Rathore and N P Singh

Metribuzin Tolerance Genotypes in *Pisum sativum*

Seasonal weeds impart high competition to the crops for resources and also harbour many insect-pests and diseases. *Pisum sativum* is well known for its sensitivity to most of the potential post-emergence herbicides and thus, efficient weed management is a difficult task. Herbicide resistance is the most efficient way to control weeds and yield losses. So far, no report is available for herbicide tolerant genotypes in *Pisum sativum*. Therefore, an attempt was made to identify the genotypes resistant to the post-emergence herbicide metribuzin. In preliminary screening, 822 genotypes were examined against herbicide metribuzin @ 500 g/ha during *rabi* 2015-16. After preliminary screening, a set of 85 promising genotypes was re-evaluated for confirmation on same dose during *rabi* 2016-17. Results revealed that there was huge genetic variation for tolerance against metribuzin in *Pisum sativum*. The genotypes were grouped in five categories based on visual observations and toxicity. Notably, accession P-637 witnessed high level of tolerance and five other viz., P-729, P-647, P-1075, P-2016, P-1448-2 registered moderately tolerant to reaction. Hence, aforesaid tolerant and moderately tolerant genotypes may be reconfirmed and utilized as donor to speed up breeding programme for development of herbicide tolerant fieldpea.

AK Parihar, GP Dixit, N Kumar, CP Nath, AK Singh and NP Singh

Identification of an Extra-large Seeded Genotype in Pigeonpea

Improving seed weight remains an important breeding objective in pigeonpea. In the context, we screened 96 pigeonpea genotypes to examine the genetic variability for two important seed related features viz. 100-seed weight (g) and seed density. The highest seed weight (23.65 g/100 seeds) was recorded for the genotype IPAV 16-1 followed by the genotypes IPAV 16-21 (19.75 g), IPAV 16-15 (19.71 g), IPAV 16-7 (19.67 g), IPAV 16-11 (19.40 g) and IPAV 16-17 (19.05 g). The identified extra large seeded IPAV 16-1 genotype has immense potential to reuse as a donor for improving seed weight in pigeonpea.

Satheesh Naik SJ, Abhishek Bohra, Amrit Lamichany, RK Mishra, Farindra Singh and Dibendu Datta

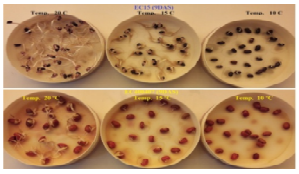
Fungicide Evaluation against *Ascochyta* Blight and *Botrytis*

A poisoned food technique was employed to identify the efficacy of five fungicides (captan, chlorothalonil, Bitertenal, copper oxychloride and carbendazim) at 100, 200 and 500 ppm concentration in the laboratory against *Ascochyta rabiei* and *Botrytis cinerea* fungi causing blight and gray mold diseases of chickpea, respectively. Carbendazim and bitertenol fungicides showed efficacy by inhibiting mycelial growth of *A. rabiei* at low concentrations (100 ppm) and, captan and chlorothalonil also performed well at higher concentrations against *Ascochyta rabiei*. Carbendazim performed well against *B. cinerea* at all the three concentrations and captan at 500 ppm was slightly effective in inhibiting the mycelial growth of *B. cinerea*. Based on inhibition of mycelial growth of the fungi, fungicides such as carbendazim, bitertenal, captan and chlorothalonil are effective against *A.rabiei* and, carbendazim and captan at 500 ppm concentration were appeared the most promising fungicides against *B. cinerea*.

Manjunatha, L., Garima Yadav, Krishna Kumar and NP Singh

Identification of Cold Stress Tolerant Rajmash Germplasm during Germination

The effect of low temperature stress on germination and t_{50} (time to reach 50% germination) was assessed in 40 rajmash genotypes at optimal (20°C) and sub-optimal (15 and 10°C) temperatures under laboratory conditions. The germination data were recorded after 23 days of incubation. Per cent reduction in germination at 10°C from that of 20°C ranged between 0.00 and 100%. However, germination *per se* was not much affected by low temperature after 23 days except for a few genotypes. t_{50} was significantly



Effect of low temperature stress on seed germination in rajmash

influenced by sub-optimal temperature particularly at 10°C. All the genotypes attained t_{50} at 20 and 15°C within 67.4-134.53 and 105.4-172.4 hours. Six genotypes (EC 400445, EC 400400, EC 400361, ET 8447, Amber and EC 400414) did not achieve t_{50} at 10°C and recorded very low germination as well. Rest of the genotypes attained t_{50} at 10°C within 173.6-288.3 hours. Few cold tolerant genotypes (IC14920, IC14351 and EC15) based on final germination and t_{50} were identified from this experiment which needs to be further validated by conducting field trials.

Basavaraja, T., Amrit Lamichaney, S.K. Chaturvedi, Shiv Sewak and N.P. Singh

Occurrence of *Alternaria* Leaf Blight in Wild Pigeonpea

Cajanus scarabaeoides, a wild relative of pigeonpea (*Cajanus cajan*) is exploited for creating genetic diversity in cultivated pigeonpea. Different accessions of *Cajanus scarabaeoides* growing in the field at ICAR-Indian Institute of Pulses Research, Kanpur during *Kharif*, 2017-18 showed leaf blight symptoms during November-December, 2017. Symptoms started by yellowing at the tip of the leaflet which later turned necrotic and appeared brown [Fig. 1 (a, b)]. Spots were circular to irregular, greyish brown in colour, 0.5-1.0 cm in diameter, with distinct dark brownish borders. At later stage of infection, these spots coalesced resulting in withering, extensive drying and shedding of leaves. Microscopic examination of diseased tissues showed growth of *Alternaria* spp. After 48 hrs. of incubation on PDA, brown to blackish, aerial mycelial growth were observed at the centre of petridishes. The fungus

Fig. 1 (a & b) Wild accession of pigeonpea infected with leaf light (c) *Septate conidia* of *A. alterneria*

were then transferred to fresh PDA plate and purified by the single-spore isolation technique. The fungus was identified as *Alterneria alternata* based on colony characters and spore morphology (Fig.1, c). *Alternaria alternata* known to cause by blight in pigeonpea is also reported here a causal agent of leaf blight of wild pigeonpea (*Cajanus scarabaeoides*).

R.K.Mishra, Naimuddin, Monika Mishra, Abhisehk Bohra, Satheesh Naik SJ, D. Dutta and Krishna Kumar

प्रौद्योगिकी हस्तांतरण

Pulse based bio-village sustainable models

A project titled "Development of pulses based bio-village sustainable models through action research for livelihood security under different agro-ecosystems in Uttar Pradesh" funded by DBT, Govt of India was implemented in collaboration of KVKs at Chitrakoot and Shahjahanpur districts. Two villages viz. Benipur in district Shahjahanpur and Kucharam in Chitrakoot were selected. To generate awareness and promote organic pulses production, 25 vermi-compost pits were established. The pits (10 x 3 x 2 ft) under MGNREGA were constructed in participatory mode at village Benipur with an expenditure of about ₹ 8,000/- of each compost pit. Individual farmers also developed cost effective pits with some modifications.

Purushottam, Rajesh Kumar and Ravindra Singh

edalhan Gyan Manch Website Launched

edalhan Gyan Manch is a interactive website developed by the institute in *Hindi* for sharing knowledge with pulse farmers, extension personnel and other stakeholders. It is a dynamic website with validated knowledge modules on 7 major pulse crops *i.e.,* chickpea, pigeonpea, lentil, urdbean, mungbean, pigeonpea and *kabuli* chickpea covering crop production, protection and post-harvest handling technologies. The website is mobile compatible and has map linked crop specific ***Varietal Information Systems (7nos)*** for major pulse crops, which helps the user to identify the recommended variety with reference to the preferred traits for particular district of the country. In addition, ***two images based diagnostic tools*** for insect pest and diseases and weeds of pulse crops are integrated in the website. It is available on **http://www.dalhangyanmanch.res.in.**

Uma Sah, D.R. Mishra, Sandeep Sharma and Ritesh Kashyap

PSMD Nursery Established

Pigeonpea sterility mosaic disease (PSMD) caused by *Pigeonpea Sterility Mosaic Virus* (*PPSMV*), a species of the genus *Emaravirus* is an important constraint for pigeonpea production in Southern and the North Eastern Plains of India. The estimated yield loss due to this disease is worth of ₹ 750 million in India alone. Generally, management of this viral disease is done by vector control through use of acaricides, which is not ecofriendly, moreover, it adds to the cost of cultivation. Use of resistant cultivars in PSMD management is most effective, economic and ecofriendly strategy. Establishment of nursery for screening pigeonpea lines or germplasms against the sterility mosaic disease is need of the hour. Keeping this in view, a pigeonpea for sterility mosaic disease nursery was established at ICAR-IIPR, Regional Research Centre, Dharwad, Karnataka to screen and identify the resistance sources.

PSMD Nursery

Saabale PR, Revanappa SB, Kodandaram MH, Venkatesh MS and Singh NP

Certified Farm Adviser Programme (Module-II)

As a part of capacity building and transfer of technology programmes of Indian Institute of Pulses Research (ICAR-IIPR), Kanpur, Certified farm adviser programme (Module-II) sponsored by National Institute of Agricultural Extension Management (MANAGE), Hyderabad was organized from October 3-17, 2017 (15 days). The trainees from various backgrounds of agricultural sciences and from different sectors of the Government and private organization attended the training programme. For module-II at IIPR, the trainees have undergone for advanced knowledge and skill based training on various pulse crops involving issues related to present scenario, challenges and opportunities in pulses in India and Global level in addition to specific focus on improved varieties, agronomic and cultural practices for sustainability, impact of climate change, resource use efficiency, integrated disease and pest management to post-harvest management of pulses.

Registered Farmers' Organization Formed

Mobilized 58 partner farmers of TL-III project into four *registered societies* in Banda, Hamirpur and Chitrakoot districts of UP state for strengthening the formal & informal seed system of pulses and for encouraging farm youth for agriprenuership in seed production of pulse crops. These farmers societies are registered with the names *"Khurkhand Beej Vikas Samiti"*, in Banda district, *"Baglai Beej Vikas Samiti"* and *"Kalla Beej Vikas Samiti"* in Chitrakoot district and *"Kusmura Beej Vikas Samiti"* in Hamirpur district. For rabi 2017-18, the partner farmers have registered about 26 ha of area for foundation seed production of high yielding disease resistant chickpea varieties Ujjawal, Shubhra, JG 14 and JS 56.

Uma Sah, S.K. Chaturvedi and P.K. Katiyar

IIPR Volleyball Team again Champion

A contingent of 47 staff members of IIPR participated in the ICAR Zonal Sports (North Zone) Tournament-2017 held at ICAR-Indian Institute of Sugarcane Research, Lucknow from 30th October to 2nd November, 2017. The contingent was accompanied by Dr. Bansa Singh as *Chief de Mission* and Dr. Ummed Singh as Team Manager. IIPR Volleyball (Smashing) team played outstandingly under the captaincy of Dr. A.K. Parihar won championship continuously second year by defeating CPRI, Shimla. Dr. Amrit Lamichaney won the gold medal in Long Jump and silver medal in 100-meter race. IIPR football team also played very well under the captaincy of Dr. K.R. Soren and was runner up in the tournament.

केन्या के वैज्ञानिक डा. स्टीफेन बीबी का भ्रमण

डा. स्टीफेन बीबी, वैज्ञानिक, सी.आई.ए.टी., केन्या ने, फार्मर फर्स्ट परियोजना के अंतर्गत, फतेहपुर जिले के कर्छलपुर, खरौली, मिराय गाँवों का भ्रमण किया और वहाँ पर उक्त परियोजना के अंतर्गत किए गए कार्यों का अवलोकन किया। उन्होंने चने के किसानों से विस्तार से वार्ता की और उनके स्थानीय तौर-तरीकों के विषय में जानकारी प्राप्त की। उन्होंने वहाँ पर हो रहे मुर्गी पालन को भी देखा एवं सम्बन्धित लोगों से जानकारी प्राप्त की।

मॉडल ट्रेनिंग कोर्स

दिनांक 13-20 नवम्बर, 2017 के मध्य संस्थान द्वारा टिकाऊ दलहन उत्पादन के लिए उन्नतशील प्रौद्योगिकी" विषय पर कृषि सहकारिता एवं किसान कल्याण विभाग, प्रसार निदेशालय, नई दिल्ली द्वारा वित्तपोषित एक मॉडल ट्रेनिंग कोर्स का आयोजन किया गया। इस प्रशिक्षण कार्यक्रम में उत्तर प्रदेश, मध्य प्रदेश, झारखण्ड, छत्तीसगढ़, कनार्टक, तमिलनाडु एवं जम्मू-कश्मीर से आए 19 प्रतिभागियों ने भाग लिया। इस प्रशिक्षण कार्यक्रम का उद्देश्य था प्रशिक्षुओं को विभिन्न सस्सीय वातववरण में उपयुक्त दलहन प्रौद्योगिकियों से सम्बन्धित नवीनतम जानकारी उपलब्ध कराना। इस प्रशिक्षण कार्यक्रम के दौरान प्रशिक्षुओं को दलहन उत्पादन के सभी पहलुओं पर जैसे कि कार्ययोजना, खेतों की तैयारी, प्रचलित विधियाँ, आईपीएम, आईडीएम जैसे सुरक्षा मानक, पश्च-कटाई प्रबन्धन, विपणन आदि पर महत्वपूर्ण जानकारी दी गई। न केवल भारत बल्कि पूरे विश्व में दलहन उत्पादन की जो वर्तमान स्थिति है, जो चुनौतियाँ/अवसर है उनपर भी प्रशिक्षण के दौरान चर्चा की गई। साथ ही साथ उन्नतशील प्रजातियों, उत्पादन एवं सुरक्षा, बदलती जलवायु का प्रभाव, प्रौद्योगिकियों की जानकारी देने में सूचना एवं संचार प्रौद्योगिकी के प्रयोग सम्बन्धी महत्वपूर्ण सूचनाएं उपलब्ध करायी गई। प्रशिक्षण के दौरान, प्रशिक्षुओं को प्रसार सम्बन्धी नवीनतम तकनीकों से भी परिचित कराया गया जिससे वे ज्यादा से ज्यादा किसानों से सम्पर्क स्थापित कर सकें। प्रशिक्षण के अंतिम चरण में, डा. एन.पी. सिंह, निदेशक ने प्रशिक्षुओं को सम्बोधित करते हुए आवाहन किया कि वे उन्नतशील प्रौद्योगिकियों को अपनाएं जिससे वे अपनी उपज एवं आय में वृद्धि कर सकें।

भ्रमण द्वारा प्रदर्शन : गत तीन माह में उत्तर प्रदेश (142), मध्य प्रदेश (254) एवं राजस्थान (40) से आए कृषकों ने संस्थान का भ्रमण किया। संस्थान आए किसानों को प्रक्षेत्रों का भ्रमण कराया गया। विशेष तौर पर टेक्नोलॉजी पार्क में लगी ग्रीष्मकालीन मूँग एवं संग्रहालय दिखाया गया, साथ ही उन्हें संस्थान द्वारा प्रकाशित साहित्य भी उपलब्ध कराया गया।

प्रशिक्षण आयोजन

- दिनांक 23-25 अक्टूबर, 2017 के मध्य आत्मा के 19 किसानों के लिए एक प्रशिक्षण का आयोजन किया गया जिसका विषय था - "दलहनी फसलों के लिए उन्नतशील उत्पादन प्रौद्योगिकी"।
- दिनांक 11-12 दिसम्बर, 2017 के मध्य महाराष्ट्र से आए 05 प्रतिभागियों के लिए मिनी दाल मिल का प्रशिक्षण आयोजित किया गया। प्रशिक्षण कार्यक्रम का विषया था "टिकाऊ दलहनी फसलों के लिए उन्नत उत्पादन प्रौद्योगिकी"।
- 18-19 दिसम्बर, 2017 के मध्य आत्मा योजना के अंतर्गत, झारखण्ड के डुमका के 19 किसानों के लिए "दलहनी फसलों के लिए उन्नतशील उत्पादन प्रौद्योगिकी" दो दिवसीय कृषक प्रशिक्षण का आयोजन विषय पर किया गया।
- दिनांक 23 दिसम्बर, 2017 को फार्मर फर्स्ट योजना के अंतर्गत, उ.प्र. के फतेहपुर जिले के 60 किसानों के लिए "दलहनी फसलों एवं सरसों में आई.पी.एम. प्रबन्धन एवं गेहूँ में सिंचाई एवं खरपतवार प्रबन्धन" विषय पर कृषक प्रशिक्षण का आयोजन किया गया।

कृषक मेले में सहभागिता: दिनांक 30 नवम्बर, 2017 को, आईसीएआर-सीआईएसएच, रहमानखेड़ा, लखनऊ में आयोजित किसान मेले में, संस्थान ने सहभागिता की और संस्थान द्वारा विकसित नवीनतम प्रौद्योगिकियों का प्रदर्शन किया गया।

Foreign Deputation

Dr. Aditya Pratap visited WorldVeg, Tainan, Taiwan between Nov., 14-24, 2017 to attend a training programme on '**Molecular breeding in mungbean'.** During this visit, Dr. Pratap also interacted with the Scientists and Staff of WorldVeg and delivered a seminar on **'Pulses improvement programme in India'.**

Honour and Award

Dr Ummed Singh, Senior Scientist was honoured with 'Distinguished Scientist Award' by Society for Bioresource and Stress Management, Kolkata in the Third International Conference on 'Bioresource and Stress Management' held at State Institute of Agriculture Management (SIAM), Jaipur, Rajasthan during November 08-11, 2017.

Personnel

Appointment

Name	Appointed as	Date of appointment
Sh. Sudhir Kumar	Scientist	16/10/2017 (F.N)
Sh. Revanasidda	Scientist	16/10/2017 (F.N)
Sh. Manu B.	Scientist	16/10/2017 (F.N)

Promotion

Name	Grade to which promoted	w.e.f.
Dr. Uday Chand Jha, Scientist	Scientist (Sr. Scale) PB-3 Rs. 15600-35100+7000(RGP)	15.12.2014
Dr. Abhishek Bohra, Scientist	Scientist (Sr. Scale) PB-3 Rs. 15600-35100+7000(RGP)	27.04.2015
Dr. Debjyoti Sen Gupta, Scientist	Scientist (Sr. Scale) PB-3 Rs. 15600-35100+7000(RGP)	03.05.2015
Dr. P.G. Patil, Scientist	Scientist (Sr. Scale) PB-3 Rs. 15600-35100+7000(RGP)	07.01.2013

Retirement

Name	Post held	Date of retirement
Sh. D. Upadhyaya	CTO	30/11/2017
Sh. Kailash Chandra Saxena	UDC	31/12/2017
Sh. Maiku Lal	SSS	31/12/2017

Director's Desk

Dear Readers,

Pulses, a major source of protein, fibre, vitamins and minerals such as iron, zinc and magnesium should be eaten as part of a healthy diet. With declining per capita consumption of pulses, the immediate concern is to enhance the protein content and other essential nutrients of the seeds through improved breeding strategies and development of biofortified seeds Although, researchers are addressing those issues pertaining to improve quality and quantity of protein and micronutrients in seeds and soon it may likely to be mandatory before releasing a variety in addition to the yield and disease resistance. But is it so easy to enhance quality of the seeds of pulses for nutritional security because certain hidden and alarming issues are there where breeders, biotechnologists, soil scientists, and policy makers need attention to make India food secured.

The data released by the National Institute of Nutrition (NIN), Hyderabad, in 2017 suggests that the foods we eat today are less nutritious than what we used to consume just three decades ago. NIN researchers have measured the values of 151 nutrients in 528 food items including pulses collected from markets across six geographical regions. All the food items and nutrients listed in the 2017 report showed a decline in quantity and quality as compared to the same food items measured in 1989. The analysis reveded a perceptible decrease in nutrition levels in all types of food. The pulses are being depleted of their key nutrient-protein, which plays an important role in building, repairing and maintaining tissues. Protein has reduced by 10.4 per cent in lentil (mungbean) and 6.12 per cent in NIN's findings in India have resonance with the global trends. In a 2004 study published in the Journal of the American College of Nutrition, researchers with the University of Texas at Austin, analysed food composition data for 43 crops grown between 1950 and 1999. Six nutrients-protein, calcium, iron, phosphorus, riboflavin and ascorbic acid-showed a significant decline in almost all the crops including pulses.

Scientists across the world have identified two reasons for this declining food nutrition. One, intensive agricultural practices have stripped the soil of micronutrients. This could well be the reason for India where soils have been found deficient in nutrients. An assessment by the Indian Institute of Soil Science, Bhopal, shows 43% of the country's soil is deficient in zinc, 18.3% in boron, 12.1% in iron, 5.6% in

manganese and 5.4 per cent in copper. "The NIN data substantiates the impact of intensive agriculture on food nutrients. The changes could also be due to different varieties of crops cultivated then and now. In commercial cultivation, the focus is now on crops that are high-yielding and disease-resistant, and not on their nutritional content.

The second reason pertains to the impact of climate change on nutritional status of food crops. Rising levels of CO_2 in the environment could also be affecting plant nutrition levels. In a 2014 study published in Nature, it was found that crop grown in high CO_2 levels had 9.3% less zinc, 5.1% less iron and 6.3% less protein. The higher atmospheric CO_2 is largely drained off into the developing grains because seeds are the ideal dumping platform to store excess CO_2 derived products as carbohydrates i.e. mainly starch. A 2015 study, published in Global Change Biology. revealed that lower protein is not due to limited access to nitrogen in the soil. Carbon assimilation and nitrogen assimilation both are highly competitive in leaf and comprising each other for common precursor synthesized during photosynthesis. Often synthesis of carbohydrates dominates over protein synthesis as protein biosynthetic pathway in leaves and seeds is largely rate limiting.

Study conducted at ICAR-IIPR, Kanpur and elsewhere showed that seed size and protein content in pulses is significant and negatively correlated with each other. Small seeded chickpea varieties developed in North India have more protein content and much tastier than large seeded chickpea in central India. As breeders developed many short duration varieties for central India, these varieties quickly trap atmospheric CO_2 for high photosynthesis during crop season such as warmer temperature and higher solar radiation. In same crop season, chickpea in North India suffers from low temperature and less solar radiation resulting in poor photosynthesis and ability of carbon gain is sufficiently reduced even under elevated CO_2 thus, giving sufficient opportunities to synthesize protein in seeds. Again the crop duration is longer enabling more diversion of protein towards seeds. Here taking decision is very critical, whether we need attractive commercially viable large seeded pulses having short maturing type with less quality traits or long duration small seeded varieties with high protein and micronutrients content.

In all probability, the poor nutritional status is here to stay. So the government should use the latest nutrient values to revise dietary regulations and nutrition, public health and agriculture policies. Long-term approaches, such as exploration of biodiversity, nutritional characterisation and mainstreaming of underutilized foods, and varietal improvement are stable and sustainable means of nutritional enhancement of foods. Diversification of foods is need of the hour. If some food is deficient in some quality aspects, it can be supplemented with other crop enriched with that nutrients. If there is a true decline, policies should begin to look at biofortification.

(N. P. Singh)

Published by Dr. N.P. Singh, Director, ICAR-Indian Institute of Pulses Research, Kanpur-208 024
Tel. : 0512-2570264; EPBAX Lines : 0512- 2572464, 2572465; Fax : 0512-2572582
E-mail : director@iipr.ernet.in ; npsingh.iipr@gmail.com; Website; http://www.iipr.res.in

Printed at Army Printing Press, 33, Nehru Road, Sadar Cantt., Lucknow-226 002. Tel. : 0522-2481164, 6565333